

~~CONFIDENTIAL~~

P-101C

26 August 1957

MEMORANDUM FOR: THE RECORD

SUBJECT : Visit to the Infrared Surveillance Branch of
USA SEL, Fort Monmouth, New Jersey

1. TIME AND PLACE OF MEETING: The meeting was held at the U. S. Army Signal Engineering Laboratories, Hexagon Building, Fort Monmouth, New Jersey, 15 August 1957. The Surveillance Branch, Evans Signal Laboratory, is the only branch in the Hexagon Building; the rest of Evans is in Fort Monmouth. The Surveillance Branch, under Harry Dauber, seems largely concerned with devices applicable to intelligence operations.

2. ATTENDANCE: William R. Dravneek Equipment Development
Section, Surveillance
Branch, USA SEL

Daniel Kelly Chief, Equip. Dev.
Sect., Surveillance
Branch, USA SEL

3. DISCUSSION:

a. "C" Units

(1) Mr. Dravneek told us that he and Lt. Ceaser of G2, Ft. Holabird, had conducted tests on our "C" units in comparison with their AN/PAC-2 units. The maximum range attained in testing the "C" units was 1500 yards. Range was limited to this maximum distance of 1500 yards because of faulty collimation of the transmitter and receiver optics. The "C" units do not at this time have provision for making collimation adjustments. The optical holding block is machined from solid aluminum; the optics are collimated and fastened to the holding block. It is believed that some of the accuracy of collimation is, therefore, lost because of machine tolerances in the unit.

DOCUMENT NO. 37
NO CHANGE IN CLASS. ☐
☐ DECLASSIFIED
CLASS. CHANGED TO: TS S 01010
NEXT REVIEW DATE: _____
AUTH: HR 70-2
DATE: 140/80 REVIEWER: 010956

The "C" unit transmitter

~~CONFIDENTIAL~~

25X1

~~CONFIDENTIAL~~

The "C" unit transmitter was used with the AN/PAC-2 receiver. Using this combination, a range of 1.5 miles was attained. The increase in range can be attributed to the 5 inch collecting mirror used in the receiver of the AN/PAC-2 as compared to the "C" unit receiver which has no collecting mirror and whose lens aperture is only one inch.

(2) Security

The "C" units use a Schott UG8 glass infra-red filter while the AN/PAC-2 uses Heilmann 205 plastic coated glass. Using the UG8 filter material, the transmitted beam of the "C" unit could be observed with the naked eye at approximately 75 yards away, when standing directly in the beam. With the Heilmann 205 filter glass, the transmitted beam of the AN/PAC-2 could not be seen with the naked eye. SEL is trading maximum range for maximum visual (or metascope) security in the line of sight. On the other hand, the "C" unit, SEL feels, should be capable of greater ranges with the wider filter band and greater modulation efficiency.

(3) Operating Temperature Range

The AN/PAC-2 has an operating range from 0° to 100° F., while the "C" unit operating temperature range is approximately 32° F. to 100° F. Mr. Dravneek said that he has performed considerable work on PbS cells and he has found that they will not operate at temperatures above 120° F. We were also told that the Signal Corps has their PbS cells cemented to glass rather than the conventional amphenol base; this is exactly parallel to [] findings.

25X1

(4) Batteries

The "C" unit can utilize either Mallory RM 12 mercury cells, Gould AA rechargeable cells or commercial pen light cells. While testing the "C" units, SEL personnel used mercury cells and complained that there was no meter installed in the "C" units to provide for checking the battery condition. Since the Mallory RM 12 mercury cells have a straight line rather than a linear discharge rate, they found that the units would be working at maximum ranges and without warning would be completely inoperative. An added objectional feature with regard to the batteries was the fact that the batteries cannot be removed from the "C" unit without completely disrupting the alignment.

(5) Lamps

The AN/PAC-2 uses a standard PR-9 lamp. However, the PR-9 has to be used with a metal collar added to its regular base. The metal collar is held in a specially made lamp alignment fixture. The PR-9 lamp is then inserted, focused and glued in that position where it is allowed to set for two hours. One transmitting lamp alignment fixture is manufactured for every ten AN/PAC-2 units.

The "C" unit uses a
~~CONFIDENTIAL~~

~~SECRET~~
-3-
~~CONFIDENTIAL~~

The "C" unit uses a commercially available bulb but is installed in a pre-focused lamp base supplied to the lamp manufacturer by the equipment contractor.

(6) Amplifier

It was thought by SEL personnel in using the equipment that the amplifier of AN/PAC-2 had a better frequency response than the "C" unit especially at the low end. They were then told that it would be hard to make field comparisons on the amplifiers since, in most cases of close talking, they would be overdriving the first stage of the "C" unit thereby introducing considerable distortion in the audio signal.

The AN/PAC-2 is constructed with plug-in printed circuit boards for both the receiver and transmitter sections. This is very convenient for servicing purposes, but adds considerably to the overall size of the unit.

(7) Alignment

The AN/PAC-2 uses a 4-power telescope having a 2 cm lens with a 5 mm eyepiece. The "C" unit uses an open bore sight. The telescope is very convenient for alignment but here again it adds considerably to the weight and size of a unit. The telescope itself is approximately 2/3 the size of the entire "C" unit.

Lt. Ceaser of G2, Ft. Holabird, is preparing a memo on the tests performed with the AN/PAC-2 in comparison with the "C" unit. A copy of that memo will probably be seen through Mr. Stulman's office.

The Northwestern University report on the B-units was very disappointing. It contained nothing on the galvanometers because N.U. had been unable to get a set for tests. The only original information, on optical imaging, is outmoded by the new high quality mirrors for the B-units. The two model B units used in the tests at Northwestern were returned to Washington with [redacted] and will be returned to O/C.

25X1

b. IR Personnel Detector

In view of the recent inquiry of APD for such a device, special note is made the SEL prototype models of the R579 (XE-3)/PAR infrared personnel detector. This is a portable (less than 10 lbs.) receiver to detect the motion of personnel. It is equipped with a 7" diameter mirror, polyethylene filter, and balanced thermistors to give a field of about 3 x 3½ mils (roughly 10 minutes of arc on a side). It is a completely passive unit. One detector sees the background, the

other the radiation

~~SECRET~~
~~CONFIDENTIAL~~

~~SECRET~~
-4-

other the radiation from a person. The speed of the device is limited by the time constant of the detector (0.5 to 3 milliseconds roughly), by the intervening atmospherics, and by the background radiation at almost the same temperature as the target. Speed is a function of the scanning principle involved, which, if sufficiently ingenious, will also take out much of the background effects; the two-thermistor approach is the one favored by Dauber's group for some years. The intervening atmospheric situation is indeterminate in the present state of the art; very reputable persons hold opposing views and the proper field work has not been done. The devices have just been



4. USA SEL INTERESTS IN RELATION TO APD/GP ACTIVITIES:

a. [redacted] Dravneek's interest is in applying the galvanometer modulation principle to the AN/PAC-2. This clearly does not conflict with, nor overlap, our work at [redacted]. Such an adaptation would be based on our latest findings and improvements under RD-54, Task 9. Dravneek will not move until he has digested the C-unit final report (which was delivered to him on 15 August) and would like one or two C-units for more exhaustive tests on efficiencies before determining the advisability of adapting the PAC-2. No commitment was made on C-unit availability, but the results of additional SEL tests should be of considerable value to us. He is thinking in terms of \$75,000 for the adaptation contract.

b. Personnel Detector: APD/GP personnel will continue to collect existing data from, probably, ERDL and [redacted] before making any recommendations. Shaping up a general requirement could proceed meanwhile. If a go-ahead decision is reached, some coordination with (or operation through) the Army is mandatory to preserve the present excellent relations amongst the technical personnel. [redacted] seemed well aware of, and sympathetic with, the situation. It should be noted that SEL field test facilities can provide a very considerable benefit to our developments.

5. ACTIONS:

a. The anticipated SEL-NU critique on the galvanometers being non-existent, the next step in the galvanometer problem is a meeting at [redacted] and APD/GP to review the situation with [redacted] there. Security set up is the only delay.

b. Decision, contingent

~~SECRET~~

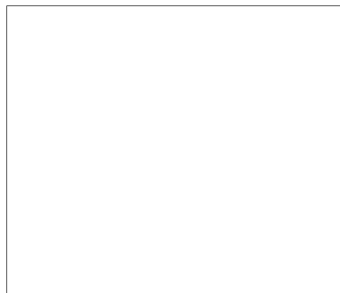
~~SECRET~~
CONFIDENTIAL

b. Decision, contingent on our needs, on placing two working C-units at SEL for two or three weeks testing. Subsequent re-work by [redacted] may be required; results could directly affect the "essential" changes needed in next C-unit procurement.

25X1

c. Further contact with SEL. Many topics, on which they have a large fund of data, were hardly touched.

25X1



Distribution:

Orig. - P-101B

1 - P-101C

1 - DMM

1 - PGN

1 - Chrono

APD:DMM/PGN:ls

~~SECRET~~
CONFIDENTIAL